#LiverTwitter: An Emerging Tool for Liver Education and Research

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#LiverTwitter has emerged as an academic forum that has begun to advance the field of hepatology by disseminating content on chronic liver diseases to a global audience. This article summarizes the content presented in a panel discussion at the 2019 Liver Meeting by highlighting the perspectives of several key types of participants in Twitter: the trainee, the medical educator, the divisional account, the scientific journal, and the passive participant. (*Hepatology Communications* 2020;4:1229-1233).

Twitter is a public space in which each of the parties invested in the present and future of liver health can interact. Clinicians, trainees, researchers, patients, journalists, in fact anyone can connect using 280-character messages, known as tweets, that can be embedded with various media, including photos and journal articles. We call the resulting community #LiverTwitter. The "#" creates a hyperlink that centralizes all tweets linked to that key word. The discussions linked by #LiverTwitter are varied, including clinical questions, journal clubs, celebrations of accomplishments of members within the hepatology community, and promoted research or events by journals, divisions, and our professional societies. At the 2019 Liver Meeting,[(1)] we held a panel discussion to highlight many of the key perspectives on #LiverTwitter. This article summarizes each presentation.

The Trainee

START LOCAL, GO GLOBAL

When a trainee first joins Twitter, her/his initial scope is typically limited to following local colleagues, well-known individuals, and hepatology-specific accounts (e.g., institutional divisions, journals, advocacy groups). However, the trainee also needs to strongly consider going global. Diversifying one's twitter feed to include accounts from other disciplines or internal medicine journals will increase exposure to research, clinical pearls, and advocacy that informs one's own education and practice. For example, Dr. Ufere began by following the hashtags #harmreduction, #cardiotwitter, #geriatrics, #epitwitter, and #statstwitter in order to identify and follow new accounts related to those hashtags.

THINK BEFORE YOU TWEET

As a trainee starts to actively engage on Twitter, s/he must remember to "Pause before you post, read before you retweet, look before you like." Diligent cognizance of how one's actions on Twitter might be interpreted by patients, peers, program and institutional leadership, professional societies, or the public at large is critical to avoid spreading misinformation or sharing unprofessional content. Also, one must remember that identifying patient information should never be shared.

Abbreviation: GIF, graphical interchange format

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The Medical Educator

THE ALTERNATIVE CLASSROOM

Moving beyond traditional teaching environments (e.g., lecture halls and small groups), social media and Twitter more specifically have emerged as effective tools for delivering educational content to learners. Twitter offers features often unavailable in traditional settings. Tweets can be embedded with pictures (e.g., conceptual models, electrocardiograms, screenshots from articles), videos (e.g., physical exam findings, lectures), graphical interchange formats (GIFs; i.e., short looped animations or videos), polls/surveys (to assess baseline knowledge and/or simulate the Socratic method), and hyperlinks to primary literature.

TWEETORIALS

The Tweetorial is an adaptation to the 280-character limit imposed by Twitter that allows for multiple concepts to be threaded together. In a Tweetorial, each tweet is linked to an introductory tweet that facilitates detailed step-wise discussions (Fig. 1). These have been used to educate, complement traditional classroom learning, and supplement newly published research by promoting the key points or the motivation for the study. Importantly, the education does not cease with the posting of a Tweetorial. As Twitter is interactive, the Tweetorial becomes an impetus for additional dialogue in the form of comments, clarifications, and questions/answers. A unique feature of Twitter is that the discussion involves both novices and experts around the world who together enhance the learning prompted by the Tweetorial.

The Divisional Account

THE BENEFITS

With the increasing popularity of medical Twitter, there has been a proliferation of accounts representing gastroenterology and hepatology divisions worldwide. Generally, the goals of the accounts have centered around increasing engagement and visibility by highlighting work and achievements by members of the division. Divisional accounts can further engage the medical community by publicizing events/conferences and serving as a recruitment tool for prospective fellows and faculty. These accounts are also the face of the division for the lay public and can serve a variety of purposes, including recruitment into clinical trials and philanthropic efforts. Furthermore, the divisional account can promote the division's achievements by increasing the visibility of published articles, presentations, and awards/grants; this can be particularly helpful for publicizing achievements by junior faculty and fellows. Similarly, achievements by senior faculty, who may not be comfortable with using Twitter, can also be amplified through the divisional account.

THE NUTS AND BOLTS

In order to start a divisional Twitter account, a critical first step is to obtain institutional approval. Most medical centers have adopted social media policies. Second, a team of individuals responsible for managing the account must be assembled. Shared/alternating responsibility for account management between two or more clinically based individuals is a practical way to ensure that the account is active and engaging. This approach is especially effective at academic meetings where several tweets can be generated each day. Third,

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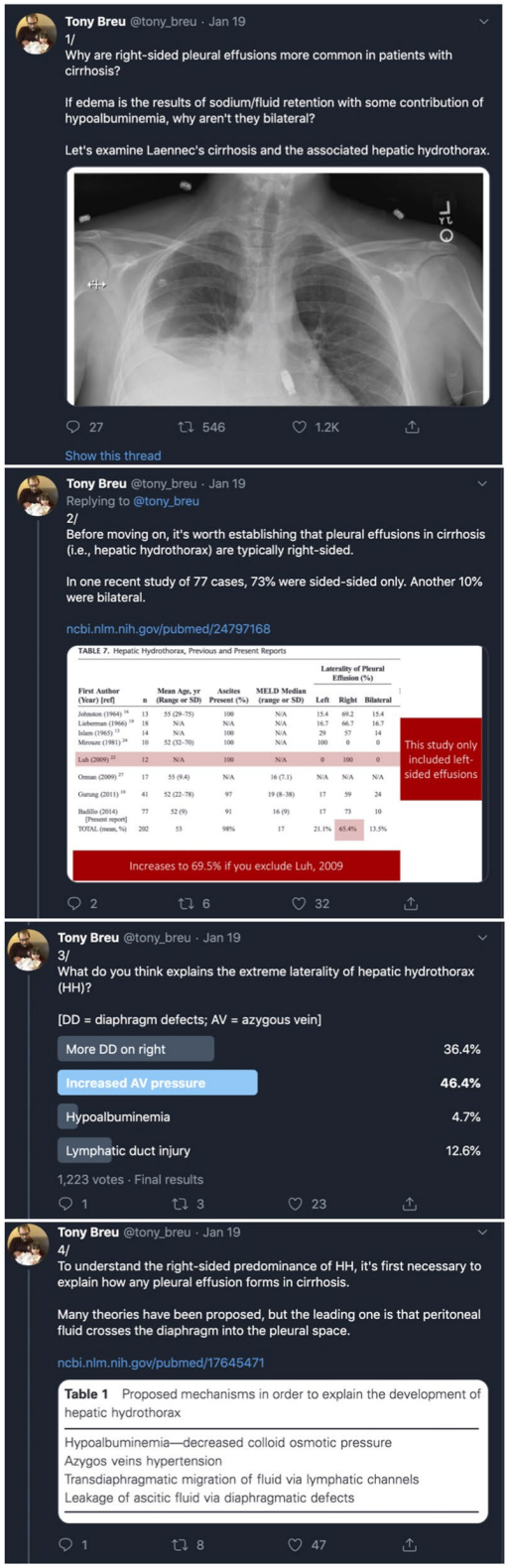

FIG. 1. An example of a portion of a Tweetorial, a collection of threaded tweets teaching about a certain topic.

specific platforms (e.g., Hootsuite, Sprout Social) allow for optimization of workflow where tweets crafted during "off-peak" hours can be scheduled for release during "peak" hours. While it requires careful planning and ongoing upkeep, a divisional Twitter account augments and disseminates information from the division to a global audience; this can have tangible benefits.

The Scientific Journal Account

Twitter has also emerged as an effective tool for scientific journals. The number of major gastroenterology and hepatology journals with dedicated Twitter accounts has doubled since 2016 and now exceeds 20 (15 of which are in the top 25 when ranked by impact factor). All four of the American Association for the Study of Liver Diseases journals have Twitter accounts. This trend is occurring because Twitter can effectively enhance the impact of journals in four major ways:

1. Circumvents publication lag. Journals now make their articles digitally available online on their website as an "early view" often months before the issue is printed. The gap between early view and print publication is called publication lag. Unless a reader is routinely checking a journal's web page for early view articles, they are not easily noticed. Twitter has revolutionized this stage of article production by providing journals the vehicle to rapidly disseminate early view articles. In this way, Twitter allows for timely delivery of advances in medicine.
2. Broadens the readership. Through the multidisciplinary communication found in Twitter's diverse social circles, the audience of an article is broadened well beyond just those individuals subscribing to the journal. For example, an article on hepatitis C eradication in a hepatology journal can now more efficiently reach physicians with an infectious disease or global health focus as well as patients and policymakers.
3. Increases the interactivity of published content. Twitter can be used to disseminate visual abstracts, which are pictorial representations of a study's key findings and have been proven to increase

readership compared to tweeted links for articles (Fig. 2).[2] *Hepatology Communications* has shared over 100 static and GIF visual abstracts in the past 12 months on Twitter. Furthermore, Twitter can be used to host journal clubs, which link a global audience to the authors in real time,[3] and promote video content related to an article.

4. Contributes to altmetric data. The Altmetric Attention Score is a weighted count of the attention an article has received from a wide variety of sources that is based on the volume of the mentions of the article, the sources of the mentions, and the authors of the mentions. Twitter is the most prominent contributor to altmetric data, which provide a more immediate surrogate assessment of impact for authors, journals, and publishers while waiting for citation counts to accrue.

The Passive Participant

Benefits notwithstanding, Twitter can be intimidating. The tone of a tweet can be hard to discern, and this may result in disagreements. Tweets or even the act of "liking" a tweet can be misinterpreted. Those who are early in their career may be nervous that they could step on a fault line, while more established researchers/clinicians may worry that their online presence and activity could attract undue or unwanted attention. Further, one must be aware that tweets can be read by patients and lay people. Before one clicks "submit," one must consider as a standard how the tweet could impact unintended audiences. For this reason, many prefer to remain "lurkers," passively deriving the benefits of the platform while contributing only when confident their perspective is needed to direct or correct a conversation.

From the perspective of an established researcher, Twitter seems an unlikely destination for the future of the hepatology community. Much of the conversation on Twitter is political, vitriolic, and nonscientific; yet, it is not difficult to filter and selectively engage. Furthermore, there has never been a platform where one could access so much information about liver disease and with such ease.

A persistent concern, however, is misinformation. It is unclear how to ensure that the information transmitted is correct without peer review. To that end, best practices should include the use of references and embedded graphics that support one's statements with data. This means that a good tweet takes time to ensure accuracy and adequately substantiate claims/arguments. #LiverTwitter must also strive to be inclusive. Tweets on liver-related topics can be seen in other languages, but this should expand with time.

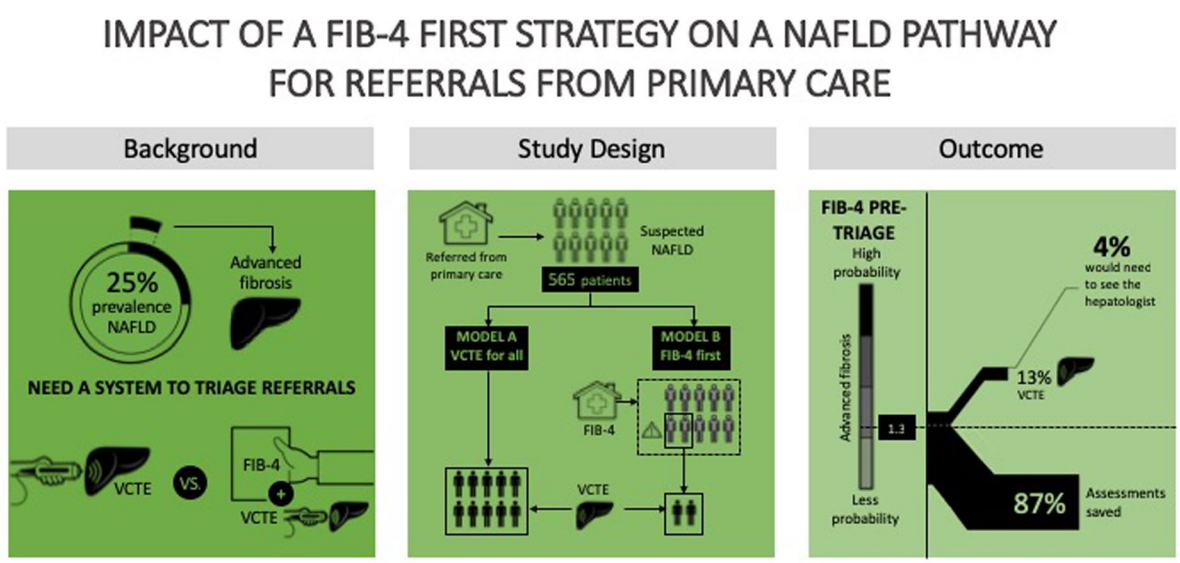

FIG. 2. An example of a visual abstract, which is a pictorial representation of a study's key findings and is an increasingly popular way to communicate research findings on Twitter. Abbreviations: FIB-4, fibrosis 4; NAFLD, nonalcoholic fatty liver disease; VCTE, vibration-controlled transient elastography. (From Davyduke et al., Hepatol Commun 2019;3:1322-1333.)

TABLE 1. BENEFITS AND RISKS OF TWITTER FROM THE PERSPECTIVES OF SEVERAL KEY PARTICIPANTS

Participant	Benefits	Risks
Trainee	• Broad exposure to research developments and clinical practices • Multidisciplinary learning opportunities • Job recruitment • Publicity for accomplishments • Increased visibility	• Negative perception of one's actions (e.g., posts, retweets, comments) by employers and the public (if misinterpreted as a nonprofessional)
Medical educator	• Incorporates unique media sources to complement teaching (e.g., GIFs, videos, hyperlinks to primary literature, polls/surveys) • Extends dialogue following the delivery of educational content	• Lack of peer review can lead to dissemination of false information
Division	• International engagement and visibility of the division • Additional publicity for faculty accomplishments and divisional events • Recruitment tool for hiring fellows and faculty • Recruitment of patients into clinical trials and for philanthropic efforts	• Labor intensive; needs several faculty members to champion the account • Negative perceptions of activity could reflect not only on division but on an entire academic institution
Scientific journal	• Circumvents publication lag • Broadens readership and augments visibility of journal • Increases interactivity of published content • Contributes to altmetric data	• Labor intensive
Passive participant	• Access beneficial aspects of the content with minimal effort • No risk of negative perception	• Missed opportunities within multidisciplinary and international relationships and collaborations

Other Participants

The benefits of Twitter are presented in Table 1, but perspectives beyond those presented in our panel discussion are important to the #LiverTwitter community. These include representatives of professional organizations (e.g., American Association for the Study of Liver Diseases) and patient advocacy groups (e.g., American Liver Foundation), who contribute by promoting their interests, activities, grant programs, and educational content. Because information provided on Twitter is accessible through conventional search engines, patients seeking answers may find #LiverTwitter. Patients themselves also engage, asking their own questions. However, without medical training and with variable research literacy, misinformation is a risk. It is unknown how patients evaluate information encountered on Twitter, but it is likely this is on the basis of the person or institution that provided it. Similarly, journalists routinely use Twitter to identify content experts. Given the participation of laypeople on the platform, decorum is essential and care is needed with each tweet. Additionally, a provider should remember to never provide medical advice to a patient on Twitter.

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